



International Journal of Economics and Business Research

ISSN online: 1756-9869 - ISSN print: 1756-9850

<https://www.inderscience.com/ijebr>

Moderation of village funds and mediation of agricultural sector growth on poverty in rural areas

Abd. Rahman Razak, Adji Achmad Rinaldo Fernandes, Nur Imam Saifullah

Article History:

Received:	12 June 2023
Last revised:	21 July 2023
Accepted:	31 July 2023
Published online:	15 November 2023

Moderation of village funds and mediation of agricultural sector growth on poverty in rural areas

Abd. Rahman Razak*

Faculty of Economics and Business,
Hasanuddin University, Indonesia
Email: arahmanrazak@fe.unhas.ac.id
*Corresponding author

Adji Achmad Rinaldo Fernandes

Faculty of Mathematics and Natural Sciences,
Brawijaya University, Indonesia
Email: fernandes@ub.ac.id

Nur Imam Saifullah

Faculty of Economics and Business,
Hasanuddin University, Indonesia
Email: saifulohni20a@student.unhas.ac.id

Abstract: This study aims to analyse the Village Fund variable in moderating the influence of agricultural sector growth, population migration, and land use change variables on poverty in rural Indonesia. The method was multigroup SEM analysis with WarpPLS. The sample of this research is 33 provinces in Indonesia using secondary data from Central Bureau of Statistics. Based on the results of the study, it is concluded that the Village Fund can moderate strengthen or weaken the influence between variables. This means that an increase in the amount of Village Fund can strengthen the relationship between these variables. The novelty in this study is the Village Fund as a moderating variable. Previous studies only measured the effect of Village Funds on poverty by positioning Village Funds as an independent variable, not as a moderating variable. Moderation is categorised into high category Village Funds and low category Village Funds.

Keywords: poverty; Village Fund; population migration; land use change; agricultural sector growth; structural equation modelling; SEM; multigroup.

Reference to this paper should be made as follows: Razak, A.R., Fernandes, A.A.R. and Saifullah, N.I. (2023) 'Moderation of village funds and mediation of agricultural sector growth on poverty in rural areas', *Int. J. Economics and Business Research*, Vol. 26, No. 4, pp.463–483.

Biographical notes: Abd. Rahman Razak is a Lecturer in Economics at Hasanuddin University. He already has several scientific publications in the field of economics starting from 2018.

Adji Achmad Rinaldo Fernandes is a lecturer in Brawijaya University at Department of Statistics. His research has a lot to do with statistical theory and its applications, as well as with data science. He has been active in conducting research and service since 2016 until now, and is active in publishing scientific articles until now the Scopus h-index score is 15.

Nur Imam Saifullah is a Lecturer in Economics at Hasanuddin University. He already has several scientific publications in the field of economics starting from 2017.

1 Introduction

Rural areas in Indonesia continue to face the problem of poverty to this day. Data published by the Central Statistics Agency (BPS) shows that the poverty rate in rural areas is still quite large, with 17,893,710 people or 14.09% of the total population in rural areas still below the poverty line set by BPS in each province in 2015 to 14,382,950 people or 12.36% in 2022. Based on this data, the poverty problems faced by rural areas in Indonesia today are still very urgent to be studied in depth, especially studies that focus on aspects of the factors that cause poverty in rural areas that are still quite high to date, so that effective efforts can be formulated to reduce poverty in rural areas.

Regarding the factors that cause poverty, the results of Brady's research (2019) show that poverty is caused by three main components that come from behavioural theories, structural theories, and political theories. Similarly, the World Bank (2003) has formulated several factors that cause poverty, namely:

- a failure of ownership, especially of land and capital
- b limited availability of basic necessities, facilities, and infrastructure
- c urban-biased and sector-biased development policies
- d differences in opportunities among community members
- e differences in human resources and economic sectors
- f low productivity
- g a poor culture of life
- h poor governance
- i over-management of natural resources.

Such conditions have spurred young and potential workers in rural areas to migrate out of their villages to urban areas and abroad. As a result, BPS data shows that the number of people in rural areas has decreased from 46.7% of Indonesia's total population in 2015 to only 42.1% in 2022. This phenomenon has been studied by several researchers before, such as Acosta et al. (2008) who found that migration increases remittances to villages and the money is used to support increased production in rural areas. However, in the study of Vargas-Silva and Rienzo (2019) found that because many people who migrate do not have the competence to work in high-paying jobs, increased migration tends to

reduce wage levels for low-paying jobs and competition for jobs is getting tougher, so there is no significant effect of migration on unemployment and income generation.

The rapid economic development of rural areas in recent decades has also triggered the growth of increasingly diverse economic activities in rural areas. This has triggered a reduction in agricultural land because it has turned into housing and industrial sites due to land conversion. This condition is related to the structural theory put forward by Brady (2019) because the expansion of the industrial and service sectors has now become dominant and shifted the role of the agricultural sector as the leading sector and the main driver of the rural economy to other economic sectors in the rural economy. The occurrence of agricultural land conversion in rural areas which tends to increase unemployment and poverty, especially for farmers who lose their land due to the conversion, has been studied by Dewi and Rudiarto (2013) and Dewi and Sarjana (2015).

To overcome the adverse conditions of the rural economy, government intervention is needed through policies to implement programs focused on spurring rural economic growth. One form of policy that is relevant and is being implemented by the government today is the Village Fund program. The implementation of the Village Fund program is relevant to the political theory put forward by Brady (2019), so it is interesting to study in depth the results after this program has been running for eight years. A report by the Ministry of Finance (2022) shows that the government has allocated IDR 20.8 trillion in Village Funds in 2015 and set a ceiling of IDR 68 trillion in 2022, an increase of 8.3% compared to 2021. It is expected that the implementation of the Village Fund program can have implications for a significant reduction in rural poverty. Studies conducted by Sunu and Utama (2019), Bukhari (2021), and Wahyuddin et al. (2019) found the same thing that Village Funds affect the level of community welfare.

Based on this literature review, this research activity is very urgent to carry out. The novelty of this research is the use of the Village Fund as a moderating variable because the Village Fund in previous studies was only used as an independent variable to measure the effect of the Village Fund on rural poverty. In this study, the role of the Village Fund as a moderating variable is emphasised to examine in depth whether the Village Fund is able to reduce population migration and agricultural land conversion rates and encourage the growth rate of the agricultural sector, so that it can ultimately reduce poverty in rural areas, or vice versa, during the 2015–2022 period.

In line with the economic development of rural areas in the agricultural sector and the Village Fund program described above, it is necessary to carry out strategies to overcome these problems. The strategy that can be done is to develop the management of the agricultural sector and the utilisation of Village Funds properly, so as to improve the economy and welfare of rural communities.

Based on the literature review as described in the results of these studies, research will be conducted with the title “Analysis of Poverty Conditions in Rural Indonesia: The Impact of Population Migration and Land Use Change through the Mediation of Agricultural Sector Growth and Village Fund Moderation”. The research was conducted to analyse the Village Fund variable in moderating the influence of the variables of agricultural sector growth, population migration, and land conversion on poverty in rural Indonesia. The novelty of this research compared to previous studies is that it is more focused on examining the extent of the influence of population migration variables, land use change, and agricultural sector growth as a factor causing poverty in rural areas during the 2015–2022 period. In this study, the role of the Village Fund as a moderating variable is emphasised, which will be studied whether the Village Fund is able to reduce

the number of population migration and agricultural land conversion and encourage the growth of the agricultural sector, so that in the end it can reduce poverty in rural areas. Theoretically, the results of this study are expected to have implications and contribute to enriching the repertoire of regional economics, especially related to rural poverty more specifically. Then practically, the results of this study are expected to have implications as information and reference material for subsequent researchers and become a source of information for future researchers.

2 Literature review

2.1 Multigroup SEM analysis

Structural equation modelling (SEM) is a statistical analysis that includes modelling relationships between variables and modelling indicators together (Solimun et al., 2017). The advantage of SEM is that it can analyse complex multivariate and multi-relational data at once. SEM is usually used to study the causal relationship between latent variables. SEM analysis combines simultaneous equation systems, path analysis, regression analysis, and factor analysis (Solimun, 2010).

SEM research is a combination of structural models and measurement models simultaneously. If there is a form of relationship between variables in the structural model, parametric SEM analysis is appropriate. If the form of relationship between structural model variables is unknown, non-parametric SEM analysis can be used. Meanwhile, if there is a partially known form of relationship between variables and a partially unknown form of relationship between variables, it can use semiparametric SEM analysis.

According to Solimun et al. (2017), moderating variables are variables that can strengthen or weaken the influence of exogenous variables on endogenous variables. Endogenous variables can be numeric or categorical (Solimun et al., 2017). If the moderating variable used is categorical, then the analysis used is called multigroup. Analysis of moderating variables with the multigroup method in principle performs structural model analysis on two or more two groups. The disadvantage of the multigroup method is that it cannot choose a particular relationship.

2.2 Population migration

Migration is any movement of people, whether permanent or semi-permanent (Skeldon, 2019). Population migration is the population that leaves the village to other villages or to urban areas and abroad as well as residents from other villages or urban areas who enter the village. Migration data is obtained by counting the number of villagers who at the time of enumeration lived in a province different from the province where they lived in the previous five years. The results of the migration calculation are expressed as a score. Migration data was obtained from the Central Bureau of Statistics publication. For data analysis, the calculation results were converted into the natural logarithm (ln).

2.3 *Land use change*

The term land use change or land conversion, which in English is called land use change or land cover change, refers to changes in the attributes of parts of the earth's land surface and immediate subsurface, including biota, soil, topography, surface and groundwater, and human structures (Turner et al., 1993). Land conversion is calculated from the measurement of the area of paddy fields, the area of oil palm plantations, and the area of non-oil palm plantations, namely land that is periodically planted with food crops, horticulture, and other plantation crops expressed in units of hectares (ha) which are then converted in the form of natural logarithms (ln) for data analysis. Data on the extent of land conversion was obtained from the Central Bureau of Statistics publication.

2.4 *Agricultural sector growth*

Agricultural sector growth is the development of the aggregate income of the Gross Regional Domestic Product of the Agricultural Sector from one particular time to the previous time (Kuncoro, 2015). The growth of the agricultural sector is calculated by subtracting the value of the GDP of the Agricultural Sector at constant 2010 prices in year t from the value in year $t-1$ (previous year), divided by the value of the GDP of the Agricultural Sector in year $t-1$, multiplied by 100%, so that the results are expressed in units of percent. Data on agricultural economic growth is sourced from the Central Bureau of Statistics.

2.5 *Village fund*

Village Funds are funds sourced from the State Budget (APBN) designated for Villages that are transferred through the Regency/City Regional Budget (APBD) and used to finance governance, development implementation, community development, and community empowerment (Article 1 of Government Regulation Number 60 of 2014 concerning Village Funds sourced from the APBN). The purpose of implementing the Village Fund is to improve public services in the village, alleviate poverty, advance the village economy, overcome development disparities between villages, and strengthen village communities as subjects of development. The management of the Village Fund in 2022 is regulated in the Regulation of the Minister of Finance of the Republic of Indonesia Number 190/PMK.07/2021 on the Management of Village Funds. The Village Fund is calculated from the amount of Village Funds transferred by the central government to the village government, which is accumulated in the district/city APBD in each province and expressed in thousands of rupiah. These rupiah units were then converted into natural logarithm (ln) for further data analysis.

Based on the Regulation of the Minister of Village PDPT Number 7 of 2021 concerning Priorities for the Use of Village Funds in 2022, the Village Fund is prioritised for national economic recovery in accordance with village authority, national priority programs in accordance with village authority, and mitigation and handling of natural and non-natural disasters in accordance with village authority. The prioritisation of the use of Village Funds for national economic recovery in accordance with village authority includes poverty reduction, establishment, development, and capacity building of village-owned enterprises/joint village-owned enterprises to realise an equitable village

economy, as well as the construction and development of productive economic businesses.

2.6 Rural poverty

Poverty is the condition of a person who is unable to fulfil the basic needs of his or her life from an economic perspective (Ravallion, 2016). Poverty is seen as an economic inability to meet basic food and non-food needs measured in terms of expenditure. People are categorised as poor if they have an average expenditure per capita per month below the poverty line (Central Bureau of Statistics, 2022). Therefore, rural poverty is calculated from the number of rural residents who have an average monthly per capita expenditure below the poverty line set by the Central Bureau of Statistics. The result of this calculation is expressed in percent (%).

2.7 The relationship between population migration and rural poverty

The relationship between population migration variables and rural poverty can be traced through previous research. The results of Adams and Page (2005) show that migration can reduce poverty, either in terms of poverty level, depth or severity through transfers or remissions. The results of this study are supported by the results of Acosta et al. (2008) who found that migration increases remittances to villages. Furthermore, the money is used to support increased production in rural areas, so that the additional capital received increases labour productivity and reduces poverty. Similarly, Bouoiyour et al. (2016) found that remittances made by migrants are not only used to support production activities but also to improve the quality of human resources through education, mastery of information technology, health services, and mastery of skills.

However, the research results described above differ from the results of Ravallion et al. (2007) who found that poverty pockets were initially located in rural areas. However, the migration of rural residents to urban areas increased urban poverty. This means that rural migration causes poverty, especially in urban areas, because people migrate faster than poverty is addressed.

Therefore, this research is focused on examining whether Village Funds that enter rural areas can play a role in reducing rural poverty by directing their management and use for basic infrastructure development and business development as well as improving the quality of human resources which will ultimately encourage increased productivity of the agricultural sector as the village's leading sector, as the results of Acosta et al. (2008) and Bouoiyour et al. (2016). Finally, through this research it can be detected that Village Funds can basically be directed to reduce rural population migration and ultimately reduce poverty in rural areas due to the support of human resources in adequate quantity and quality.

2.8 The relationship between land use change and rural poverty

Land is one of the most important factors of production for business activities in the agricultural, industrial, or service sectors. Land use can not only be influenced by internal factors, such as soil fertility, but also external factors, such as strategic location, ease of access, and so on. As a result, there has been land conversion in rural areas that have been studied by previous researchers. Research by Dewi and Sarjana (2015) found that the

conversion of agricultural land was driven by low farm income and the existence of growing businesses outside the agricultural sector. The result of this diversion is that the income of the farming community is decreasing and unemployment is increasing due to the loss of their jobs.

Based on the results of this study, it can be seen that one of the factors causing the conversion of agricultural land in rural areas is due to low farm income, which is certainly one of the causes of poor farmers. Therefore, this study focuses more on examining the role of Village Funds in encouraging an increase in farm income managed by farmers through increased farm productivity, so that they will continue to maintain their agricultural land not to be converted to other sectors. This is very important considering that the conversion of agricultural land has increased poverty in rural areas, especially farmers as agricultural land owners and farm business managers.

2.9 The relationship between agricultural sector growth and rural poverty

The relationship between agricultural growth variables and poverty in rural areas can be linked to Foster and Rosenzweig's (2004) statement that economic growth in the agricultural sector is the key to reducing rural poverty. Given that agriculture is the main activity of people in rural areas, increased productivity triggers the acquisition of more wages, which can reduce poverty.

Related to this, the research results of Suryahadi et al. (2009) and Zaman and Khilji (2013) support this statement. They have examined the relationship between sectoral economic growth and poverty reduction by urban and rural areas. Their results show that economic growth can reduce poverty in all sectors and locations. Even the growth of the agricultural sector plays a major role in reducing rural poverty.

Therefore, this study focuses on analysing the relationship between agricultural sector growth as an intermediary variable and rural poverty, which can be strengthened or weakened by the Village Fund variable as a moderating variable. This study examines the role of Village Funds as a moderating variable in encouraging the growth of the agricultural sector in rural areas through the use of Village Funds in building basic infrastructure needed in the development of the agricultural sector, such as irrigation networks, farm roads, and additional farming capital through Village-Owned Enterprises, so as to facilitate accessibility to agricultural production centres in rural areas and accelerate and reduce transport costs to transport agricultural sector commodities from production centres to markets and ultimately increase farmers' income and reduce poverty in rural areas through the growth of the agricultural sector in the region.

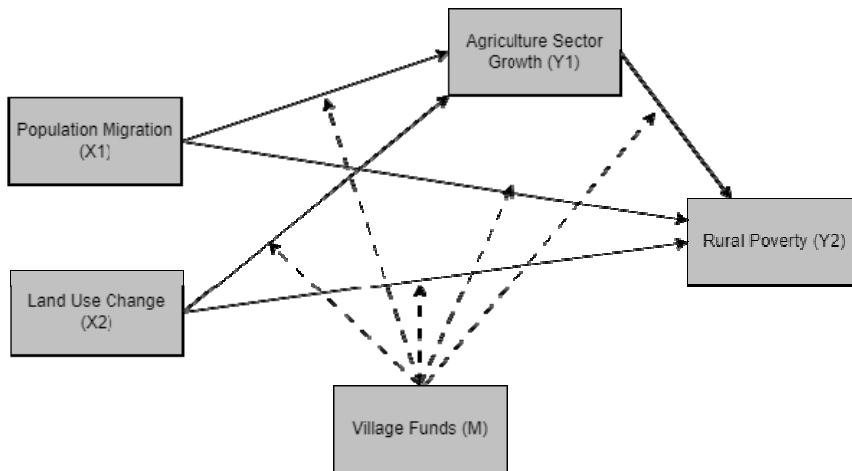
3 Research methods

This study aims to determine the effect of population migration, land use change on rural poverty with agricultural sector growth as a mediating variable and Village Fund as a moderating variable. The data used is a type of panel data which is data from 33 provinces excluding DKI province because it does not have villages, with a period of 2015–2022 (eight years). Data sources are taken from publications issued by the Central Bureau of Statistics, Bank Indonesia, and related ministries so that all of them are secondary data collected using documentation techniques. The data collected are data on rural poverty, agricultural sector growth, Village Funds, population migration, and land

conversion from all provinces. The unit of analysis in this study is 33 provinces in Indonesia. The number of samples used in this study is the same as the number of study population, so the sample technique used in this study is saturated sampling technique. According to Sugiyono (2014), the saturation sampling technique is a determination technique sample if all members of the population are used as the sample. Technique saturated sampling is used because the population size is relatively small, that is 33 provinces.

The data analysis used was multigroup SEM with the help of WarpPLS software. The Village Fund variable is classified into two groups based on the average variable value. The value of the Village Fund latent variable was calculated first through the average score variable value. Next, the average of all Village Fund variable values was sought. Observations with values above the mean were included in group 1 (low Village Fund) and observations with values below the mean were included in group 2 (high Village Fund). The analysis model is shown in Figure 1.

Figure 1 Research model



The hypothesis formulated based on the above conceptual framework is as follows:

- H_1 Effect of population migration on agricultural sector growth.
- H_2 Effect of land use change on agricultural sector growth.
- H_3 Effect of population migration on rural poverty.
- H_4 Effect of land use change on rural poverty.
- H_5 The effect of agricultural sector growth on rural poverty.
- H_6 The influence of the Village Fund in weakening or strengthening the relationship between population migration and agricultural sector growth.
- H_7 The influence of the Village Fund in weakening or strengthening the relationship between land use change and agricultural sector growth.

- H_8 The influence of the Village Fund in weakening or strengthening the relationship between population migration and rural poverty.
- H_9 The influence of the Village Fund in weakening or strengthening the relationship between land use change and rural poverty.
- H_{10} The influence of the Village Fund in weakening or strengthening the relationship between agricultural sector growth and rural poverty.

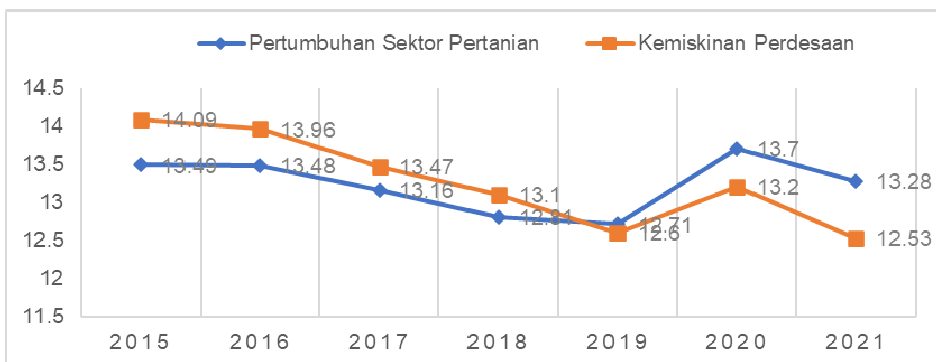
4 Results and discussion

4.1 Descriptive analysis

BPS data shows that the national rural poverty rate in Indonesia in 2021 reached 12.53%, so it can be seen that there are still several provinces that have higher rural poverty rates than the national rural poverty rate. These provinces include Aceh (18.04%), East Nusa Tenggara (24.42%), Gorontalo (24.38%), Maluku (24.34%), West Papua (33.50%), and Papua (36.50%). In addition, it can also be seen that the provinces on Java Island have a rural poverty rate of 11.54% in 2021, which is higher than the rural poverty rate in the provinces on Kalimantan Island, which is only 7.50%.

Furthermore, the growth of the agricultural sector and the rural poverty rate in Indonesia in the 2015–2021 periods can be seen in Figure 2.

Figure 2 Growth of the Agricultural Sector and Rural Poverty in Indonesia, 2015–2021 (see online version for colours)



Source: Central Bureau of Statistics (2021)

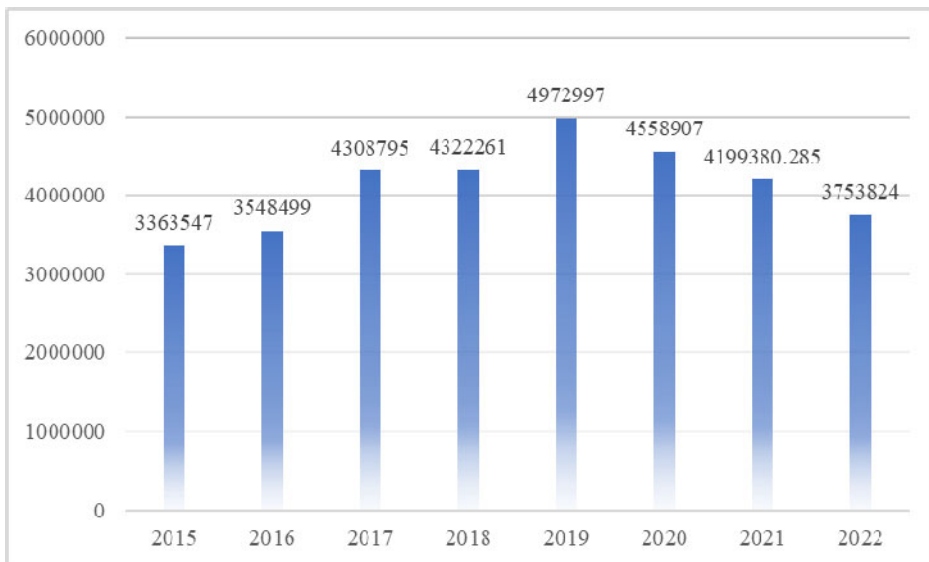
Figure 2 shows that the contribution of the agricultural sector to the total Gross Domestic Product (GDP) experienced fluctuating growth during the 2015–2022 period with an average of only 13.23%. In addition, it can also be seen that the growth of the agricultural sector is positively correlated with rural poverty during 2015–2022, that is, a decrease in agricultural sector growth is followed by a decrease in rural poverty and vice versa. These conditions indicate the influence of agricultural sector growth on poverty in rural areas during the observation period.

However, the contribution of the agricultural sector to Indonesia's total GDP tends to decrease in the 2015–2021 period, which amounted to 13.52% in 2015 and decreased to

13.28% in 2021. Similarly, the number of labour force working in the agricultural sector as the basic sector of rural areas has experienced a significant decline during the same period, namely 32.876% of the total labour force working in 2015 down to only 28.33% in 2021. This condition is caused by several factors, including the migration of potential residents of rural areas, especially young people, to urban areas and abroad and the conversion of agricultural land to other sectors, such as industry, warehousing, housing, and so on.

The occurrence of population migration in Indonesia has been going on for a long time, but only began to be recorded by the Central Bureau of Statistics in 1980. The source of the record is obtained from the results of the Population Census (*Sensus Penduduk*) and the Inter-Census Population Survey (*Survei Penduduk Antar Sensus*) conducted every ten years by the Central Bureau of Statistics nationally. Based on this data, it can be seen the development of population migration out of various provinces in Indonesia during the 2015–2022 period is shown in Figure 3.

Figure 3 Development of Rural Population Migration in Indonesia (see online version for colours)



Source: Central Bureau of Statistics (2022)

Figure 3 shows an increasing trend in the number of rural residents who migrated during 2015–2019, from 3,363,547 people in 2015 to 4,972,997 people in 2019, then a decrease in the number in the 2020–2022 period, from 4,558,907 people in 2020 to 3,753,824 people in 2022. The migrating rural population is dominated by young and educated people, so it is a potential population that is actually very much expected to live in rural areas to manage and develop business activities, especially those based on the agricultural sector as the leading sector of rural areas in order to provide employment and increase the income of the village population.

As previously described, the conversion of agricultural land in rural areas has increased every year during the 2015–2021 period. As a result, the area of agricultural land in Indonesia has also changed during this period, from 14,115,501 hectares in 2015

to only 10.605.978 hectares in 2021 (Central Bureau of Statistics, 2022). Of course, this condition will exacerbate the problem of poverty in rural areas because of the increasingly narrow agricultural land that can be cultivated by farmers as their main livelihood with their families, which will reduce their household income. In addition, the conversion of agricultural land that originally belonged to farmers to be used as industrial development sites, warehouses, housing, road infrastructure, and so on, has directly led to the loss of assets owned by farmer households, so that the number and value of assets they have is decreasing and ultimately can also trigger an increase in the poverty rate of farmer households in rural areas so far, so that it has become one of the factors inhibiting the implementation of village economic development programs so far.

To overcome these problems, the government has made various efforts through the implementation of various forms of policies manifested in several forms of programs specifically aimed at realising the acceleration of economic development in rural areas and reducing poverty in these areas. One form of government policy that has been taken since 2015 until now to overcome the problem of poverty in rural areas is the implementation of the Village Fund program to be distributed to all villages every year. Data from the Ministry of Finance (2022) shows that the amount of Village Funds transferred by the central government to village governments has increased every year during the 2015–2021 period, from IDR 20.76 trillion in 2015 to IDR 71.85 trillion in 2021. The number of villages receiving Village Funds in 2015 reached 74.093 villages, with each village receiving an average allocation of IDR 280 million. Then the number of recipient villages in 2021 reached 74.954 villages, so that each village received an average allocation of IDR 958 million. This condition shows that there is a strong effort that has been carried out by the central government to realise the acceleration of development and improve the performance of the village economy in Indonesia, thus adopting a policy to increase the amount of Village Funds allocated in the APBN every year. Through the increase in the number of allocations each year, it is expected that the poverty rate in rural areas will decrease along with the increase in basic infrastructure development and business development through business capital assistance programs for micro and small business managers financed by Village Funds in each village.

4.2 Model feasibility test

To see the goodness of the model in the SEM-PLS analysis, a fit test is carried out on the data owned. Goodness of Fit is an index that describes the goodness of the relationship model between latent variables. The Goodness of Fit value of the Group 1 Model can be seen in Table 1.

In Table 1, it can be seen that the model formed is good. This can be seen from the APC, ARS, and AAR criteria which have a p-value <0.05, the AVIF, AFVIF, SPR, and RSCR values obtained have met the ideal criteria, the GoF value obtained is also quite large, and the SSR and NLBCDR values indicate that the model is good. From the results of the Goodness of Fit test, the Group 1 models resulted in good confirmation of the variables and the causal relationship between variables. The total R-square of the group 1 model is 0.673. This means that 67.30% of group 1 data can be explained by the model, while the remaining 32.7% is explained by other variables outside the model.

Table 1 Model fit and quality indices group 1

<i>Model fit and quality indices</i>	<i>Test statistics</i>	<i>Criteria</i>	<i>Description</i>
Average path coefficient (APC)	0.445, P = 0.015	P < 0.05 significant	Significant
Average R-squared (ARS)	0.360, P = 0.039	P < 0.05 significant	Significant
Average adjusted R-squared (AARS)	0.297, P = 0.002	P < 0.05 significant	Significant
Average block VIF (AVIF)	1.182	Acceptable if ≤ 5 , Ideally ≤ 3.3	Ideally
Average full collinearity VIF (AFVIF)	1.478	Acceptable if ≤ 5 , Ideally ≤ 3.3	Ideally
Tenenhaus GoF (GoF)	0.528	Small ≥ 0.1 , Medium ≥ 0.25 , Large ≥ 0.36	Large
Simpson's paradox ratio (SPR)	1.000	Acceptable if ≥ 0.7 , Ideally = 1	Ideally
R-squared contribution ratio (RSCR)	1.000	Acceptable if ≥ 0.9 , Ideally = 1	Ideally
Statistical suppression ratio (SSR)	1.000	Acceptable if ≥ 0.7	Acceptable
Nonlinear bivariate causality direction ratio (NLBCDR)	1.000	Acceptable if ≥ 0.7	Acceptable

Table 2 Model fit and quality indices of group 2

<i>Model goodness</i>	<i>Test statistics</i>	<i>Decision criteria</i>	<i>Description</i>
Average path coefficient (APC)	0.445, P = 0.041	P < 0.05 significant	Significant
Average R-squared (ARS)	0.360, P = 0.024	P < 0.05 significant	Significant
Average adjusted R-squared (AARS)	0.297, P = 0.017	P < 0.05 significant	Significant
Average block VIF (AVIF)	1.028	Acceptable if ≤ 5 , Ideally ≤ 3.3	Ideally
Average full collinearity VIF (AFVIF)	1.467	Acceptable if ≤ 5 , Ideally ≤ 3.3	Ideally
Tenenhaus GoF (GoF)	0.428	Small ≥ 0.1 , Medium ≥ 0.25 , Large ≥ 0.36	Large
Simpson's paradox ratio (SPR)	1.000	Acceptable if ≥ 0.7 , Ideally = 1	Ideally
R-squared contribution ratio (RSCR)	1.000	Acceptable if ≥ 0.9 , Ideally = 1	Ideally
Statistical suppression ratio (SSR)	1.000	Acceptable if ≥ 0.7	Acceptable
Nonlinear bivariate causality direction ratio (NLBCDR)	1.963	Acceptable if ≥ 0.7	Acceptable

Furthermore, the results of the Goodness of Fit test for Group 2 models are presented in Table 2.

Based on the data in Table 2, the same conclusion is obtained, namely that the model formed for Group 2 is good. This can be seen from the APC, ARS, and AAR criteria which have a p -value <0.05 , the AVIF, AFVIF, SPR, and RSCR values obtained have met the ideal criteria, the GoF value obtained is also quite large, and the SSR and NLBCDR values indicate that the model is good. From the results of the Goodness of Fit test, the Group 1 and Group 2 models resulted in good confirmation of the variables and the causal relationship between variables. The total R-square of the group 1 model is 0.673. This means that 67.30% of group 1 data can be explained by the model, while the remaining 32.7% is explained by other variables outside the model. The total R-square of the group 2 model is 0.536. This means that 53.60% of group 2 data can be explained by the model, while the remaining 46.4% is explained by other variables outside the model.

4.3 Outer model

The outer model value in this research is seen based on the weight value. The weight value is used to see the strongest item to compose a variable. The results of the Group 1 outer loading analysis are shown in Table 3.

Table 3 Results of loading analysis of Group 1 indicators

<i>Variables</i>	<i>Item</i>	<i>Weight</i>	<i>p-value</i>	<i>Conclusion</i>
Population migration (X1)	In-migration	2.8288	0.0040	Significant
	Out-migration	2.0680	0.0234	Significant
Land use change (X2)	Community Welfare	2.3279	0.0132	Significant
	Land tenure pattern	3.7597	0.0003	Significant
	Land use pattern	4.6186	0.0000	Significant
Village fund (M)	Community empowerment	3.8072	0.0003	Significant
	Village fund allocation	2.7147	0.0053	Significant
Economics sector growth (Y1)	Natural resources	3.6218	0.0005	Significant
	Human resources	3.1017	0.0020	Significant
	Capital formation	2.2925	0.0143	Significant
Rural poverty (Y2)	Education level	2.4752	0.0094	Significant
	Community Income	3.8072	0.0003	Significant
	Access to health services	3.5980	0.0005	Significant

From Table 3, it can be seen that for Group 1, the strongest indicator of the Population Migration variable is In-migration with a weight of 2.8288. The strongest indicator composing the Land Use Change variable is the Land Use Pattern with a weight of 4.6186. The strongest indicator composing the Village Fund variable is Community Empowerment with a weight of 3.8072. The strongest indicator composing the Agricultural Sector Growth variable is Natural Resources with a weight of 3.6218. The strongest indicator composing the Rural Poverty variable is Community Income with a weight of 3.8072.

For group 2 loading analysis, the weight value is also used to see which indicator is the strongest constituent for the variable. The results of the Group 2 outer loading analysis are shown in Table 4. The results of the Group 2 outer loading analysis are shown in Table 4.

From Table 4, it can be seen that for Group 2, the strongest indicator of the Population Migration variable is In-migration with a weight of 4.3495. The strongest indicator composing the Land Use Change variable is the Land Tenure Pattern with a weight of 4.7589. The strongest indicator composing the Village Fund variable is Community Empowerment with a weight of 3.9526. The strongest indicator composing the Agricultural Sector Growth variable is Natural Resources with a weight of 4.9978. The strongest indicator composing the Rural Poverty variable is the level of education with a weight of 3.7526.

Table 4 Results of loading analysis of Group 2 indicators

<i>Variables</i>	<i>Item</i>	<i>Weight</i>	<i>p-value</i>	<i>Conclusion</i>
Population migration (X1)	In-migration	4.3495	0.0001	Significant
	Out-migration	2.7078	0.0054	Significant
Land use change (X2)	Community welfare	4.5187	0.0000	Significant
	Land tenure pattern	4.7589	0.0000	Significant
	Land use pattern	3.8072	0.0003	Significant
Village fund (M)	Community empowerment	3.9526	0.0002	Significant
	Village fund allocation	3.0475	0.0023	Significant
Economics sector growth (Y1)	Natural resources	4.9978	0.0000	Significant
	Human resources	3.7031	0.0004	Significant
	Capital formation	2.8091	0.0042	Significant
Rural poverty (Y2)	Education level	3.7526	0.0003	Significant
	Community income	2.5163	0.0085	Significant
	Access to health services	2.8058	0.0042	Significant

Based on the data in Tables 3 and 4, it can be concluded that all variable indicator weights in group 1 are significant. Therefore, it can be concluded that all indicators that make up the Population Migration variable (X1) have a significant effect as a measure of the Population Migration variable (X1), as well as the indicators of the Land Use Change variable (X2), Village Funds (M), Agricultural Sector Growth (Y1), and Rural Poverty (Y2).

4.4 *Inner model*

The inner model is a specification of the relationship between latent variables. According to Solimun et al. (2017), the purpose of designing the inner model is to find out how the relationship between latent variables. Latent variables and indicators or manifest variables can be standardised without losing their general nature. Inner models are also called structural models. The coefficient generated from the inner model that is formed describes the direction and strength of the relationship between one variable and another.

The sign of the coefficient (positive/negative) indicates the direction of the relationship, while the size of the coefficient indicates the strength of the relationship. The existence of a significant relationship is indicated by a p-value of <0.05 . There are two types of influence analysed in SEM-PLS, namely direct effect and indirect effect. The results of the analysis of direct effect and indirect effect are presented in the next subsection.

4.5 Direct effect

In this study, the direct effect and indirect effect between variables were analysed. The results of direct effect testing are presented in Table 5.

Hypothesis testing was conducted on each direct partial effect path:

- In testing the effect of population migration (X1) on agricultural sector growth (Y1), for both groups the p-value <0.05 was obtained, so it can be concluded that there is a significant effect between population migration and agricultural sector growth. The relationship between the two variables is negative, meaning that any increase in population migration will decrease agricultural sector growth.
- In testing the effect of land use change (X2) on agricultural sector growth (Y1), for both groups, the p-value <0.05 was obtained, so it can be concluded that there is a significant effect between land use change and agricultural sector growth. The relationship between the two variables is negative, meaning that any increase in the rate of land use change, will decrease agricultural sector growth.
- In testing the effect of population migration (X1) on rural poverty (Y2), for both groups the p-value >0.05 was obtained, so it can be concluded that there is an insignificant effect between population migration on rural poverty. This means that any change in the population migration rate does not affect the rural poverty rate.
- In testing the effect of land use change (X2) on population poverty (Y2), for both groups the p-value <0.05 was obtained, so it can be concluded that there is a significant effect between land use change and rural poverty. The relationship between the two variables is positive, meaning that any increase in the land use change rate will increase rural poverty.
- In testing the effect of agricultural sector growth (Y1) on rural poverty (Y2), for both groups the p-value <0.05 was obtained, so it can be concluded that there is a significant effect between agricultural sector growth and rural poverty. The relationship between the two variables is negative, meaning that any increase in the agricultural sector growth rate will decrease the rural poverty rate.

Based on the tests in Table 5, it can be seen that the Village Fund variable can only moderate 4 relationships between existing variables, namely the relationship between population migration to agricultural sector growth, land use change to agricultural sector growth, land use change to rural poverty, and agricultural sector growth to rural poverty. Meanwhile, the relationship between the population migration variable and rural poverty cannot be moderated by the Village Fund variable. These conditions indicate that the Village Fund can basically be used to encourage the growth of the agricultural sector as

the leading sector in rural areas, so that it can be expected to play a role in reducing population migration and land use change, which in turn will reduce poverty in rural areas. However, the Village Fund cannot moderate the relationship between the population migration variable (X1) and the rural poverty variable (Y2), so it cannot be used to strengthen the relationship between these two variables. Therefore, the Village Fund cannot be used effectively by the village government in reducing poverty in the village through efforts to inhibit the out-migration of its population, which is generally a young and educated population, because the Village Funds received each year are not yet sufficient in amount to be used in expanding employment sufficiently to increase the income of residents in rural areas.

4.6 *Indirect effect*

Furthermore, the indirect effect between variables was analysed. The results of indirect effect testing are presented in Table 6.

Based on the data in Table 6, it can be seen that:

- Hypothesis testing of the effect of population migration (X1) on rural poverty (Y2) through agricultural sector growth (Y1), for both groups, yields a p-value <0.05, so it can be concluded that there is a significant effect of population migration (X1) on rural poverty (Y2) through agricultural sector growth (Y1). This means that the higher the population migration (X1) will increase the rural poverty rate (Y2) indirectly and significantly.
- Hypothesis testing of the effect of land use change (X2) on rural poverty (Y2) through agricultural sector growth (Y1), for both groups, resulted in a p-value <0.05, so it can be concluded that there is a significant effect of either group 1 or group 2, land use change (X2) on rural poverty (Y2) through agricultural sector growth (Y1). This means that an increase in land use change (X2) will increase rural poverty (Y2) indirectly and significantly.

Based on the tests in Table 6, it can be seen that the Village Fund variable can moderate in the form of strengthening the indirect relationship between the population migration variable (X1) and the rural poverty variable (Y2) through the agricultural sector growth variable (Y1) significantly. In addition, it can also be seen that the Village Fund variable can moderate in the form of significantly strengthening the indirect relationship between the land use change variable (X2) and the rural poverty variable (Y2) through the agricultural sector growth variable (Y1). These conditions indicate that efforts to reduce poverty in rural areas through reducing the number of out-migration of rural residents and preventing the conversion of agricultural land can be realised through the implementation of the Village Fund program, which is focused on allocating it to finance the development of basic infrastructure in the village, such as agricultural irrigation, village roads in agricultural production centres, village markets, agro-industries, and so on, coupled with a program of providing farming capital assistance to encourage the growth of the agricultural sector and increase household income in rural areas.

Table 5 Results of direct effect analysis

Direct effect Relationship	Group: Low M					Group: High M					Conclusion
	Est.	SE	CR	P-value	Res.	Est.	SE	CR	P-value	Res.	
X1->Y1	-0.133	0.058	-2.258	0.023	S	-0.147	0.040	-3.601	0.000	S	Moderation strengthens
X2->Y1	-0.202	0.045	-4.420	0.000	S	-0.237	0.057	-4.170	0.000	S	Moderation strengthens
X1->Y2	0.049	0.047	1.035	0.300	TS	0.057	0.043	1.328	0.183	NS	No moderation
X2->Y2	0.130	0.044	2.934	0.003	S	0.149	0.052	2.873	0.004	S	Moderation strengthens
Y1->Y2	-0.217	0.045	-4.742	0.000	S	-0.242	0.044	-5.392	0.000	S	Moderation strengthens

Notes: S: Significant; NS: Not significant

Table 6 Results of indirect effect analysis

<i>Indirect effect</i>	<i>Group: Low M</i>					<i>Group: High M</i>					<i>Conclusion</i>	
	<i>Est.</i>	<i>SE</i>	<i>CR</i>	<i>P-value</i>	<i>Res.</i>	<i>Est.</i>	<i>SE</i>	<i>CR</i>	<i>P-value</i>	<i>Res.</i>		
<i>Relationship</i>												
X1->Y1->Y2	0.029	0.014	2.038	0.041	S	0.036	0.012	2.995	0.003	S	S	Moderation strengthens
X2->Y1->Y2	0.044	0.014	3.234	0.001	S	0.058	0.017	3.299	0.001	S	S	Moderation strengthens

Note: S: Significant

5 Conclusions

Based on the research results, the following conclusions can be obtained:

- 1 Village Funds can moderate in the form of strengthening the direct relationship between the population migration variable to agricultural sector growth, the land use change variable to agricultural sector growth, the land use change variable to rural poverty, and the agricultural sector growth variable to rural poverty. This means that an increase in the amount of Village Fund can strengthen the relationship between these variables, and vice versa.
- 2 Village Funds cannot moderate (strengthen or weaken) the relationship between the population migration variable and rural poverty.
- 3 The Village Fund can strengthen the relationship between the population migration variable indirectly through the agricultural sector growth variable, which has a significant effect on rural poverty. This means that rural poverty can be reduced through strengthening the Village Fund program to create millennial farmers and increase agricultural productivity to prevent out-migration of potential village residents and increase the growth of the agricultural sector.
- 4 The Village Fund can strengthen the relationship between the land use change variable indirectly through the agricultural sector growth variable which has a significant effect on rural poverty. This means that the rural poverty rate can be reduced through strengthening the Village Fund program to encourage an increase in farming income, so that farmers continue to maintain their agricultural land not to be converted to other sectors.
- 5 The growth of the agricultural sector has a significant effect on rural poverty, so that it must always be encouraged to increase the productivity of agricultural sector businesses through the application of appropriate technology and the provision of production facilities that are cheap and easily accessible to farmers and post-harvest improvements and processing through agro-industry financed by the village government using Village Funds.
- 6 The rural poverty rate in Indonesia can be reduced by preventing land conversion and increasing the growth of the agricultural sector through the management of Village Funds in the right program, on target and on time, so that its use is more effective.

Furthermore, based on the conclusions obtained from the results of this study, several suggestions can be recommended as follows:

- 1 The government needs to increase the amount of Village Fund allocated to each village every year by strengthening its utilisation in building basic infrastructure and developing productive businesses based on the agricultural sector as the leading sector of rural areas from upstream to downstream through the development of agro-industry as its support. This is intended to encourage an increase in the income of rural residents through the growth of the agricultural sector and a decrease in land conversion and out-migration of rural residents.

- 2 To prevent an increase in the conversion of agricultural land which encourages a decrease in the growth of the agricultural sector and an increase in poverty in rural areas, the local government needs to intensely encourage investors to invest in businesses in the agricultural sector, especially in sub-sectors that are superior to each village by applying appropriate technology that is cheap and easily adopted by farmers in the village. For this reason, the investment climate in the village needs to be encouraged by presenting millennial farmers and supported by the availability of adequate basic infrastructure.
- 3 The growth of the agricultural sector needs to be improved through the development of management of each village's leading agricultural sub-subsectors from upstream to downstream, so that agricultural sub-sub-sector products produced by each village must be processed first to produce semi-finished or finished goods before being sold in order to increase added value, prices, and competitiveness as well as the income of farmer households as producers.
- 4 Efforts to reduce poverty in rural areas need to be realised immediately through agricultural business development programs to encourage the growth of the agricultural sector and prevent population migration and conversion of agricultural land in rural areas. For this reason, village governments need to manage the Village Funds received each year to boost basic infrastructure development and advance the economy and reduce poverty in their villages by allocating them to programs and activities that are well-targeted and pro-poor.

References

- Acosta, P., Calderón, C., Fajnzylber, P. and Lopez, H. (2008) 'What is the impact of international remittances on poverty and inequality in Latin America?', *World Development*, Vol. 36, No. 1, pp.89–114, <https://doi.org/https://doi.org/10.1016/j.worlddev.2007.02.016>.
- Adams, R.H. and Page, J. (2005) 'Do international migration and remittances reduce poverty in developing countries?', *World Development*, Vol. 33, No. 10, pp.1645–1669, <https://doi.org/https://doi.org/10.1016/j.worlddev.2005.05.004>.
- Bouoiyour, J., Miftah, A. and Mouhoud, E.M. (2016) 'Education, male gender preference and migrants' remittances: Interactions in rural Morocco', *Economic Modelling*, Vol. 57, pp.324–331, <https://doi.org/https://doi.org/10.1016/j.econmod.2015.10.026>.
- Brady, D. (2019) 'Theories of the causes of poverty', *Journal Annual Review of Sociology*, Vol. 45, No. 4, pp.155–175.
- Bukhari, E. (2021) 'The effect of village funds in alleviating village poverty', *Journal of Scientific Studies*, Vol. 21, No. 2, pp.219–228.
- Central Bureau of Statistics (2021) *Regulation of the Head of the Central Bureau of Statistics Number 120 of 2020 Concerning the Classification of Urban and Rural Villages in Indonesia in 2020*, Indonesia.
- Central Bureau of Statistics (2022) *Statistics Indonesia 2022* [online] <https://www.bps.go.id/publication/2022/02/25/0a2afea4fab72a5d052cb315/statistik-indonesia-2022.html> (accessed 11 July 2023).
- Dewi, I.A.L. and Sarjana, I.M. (2015) 'Factors driving the alihfungsi of rice fields into non-farming land (case: Subak Kerdung, South Denpasar District)', *Journal of Agribusiness Management*, Vol. 3, No. 2 [online] <https://repositori.unud.ac.id/protected/storage/upload/repository/5de6120133ac494972833baae6d04a53.pdf> (accessed 10 July 2023).

- Dewi, N.K. and Rudiarto, I. (2013) 'Identification of agricultural land conversion and socio-economic conditions of peripheral communities in Gunungpati District, Semarang City', *Journal of Region and Environment*, Vol. 1, No. 2, p.175, <https://doi.org/10.14710/jwl.1.2.175-188>.
- Foster, A.D. and Rosenzweig, M.R. (2004) *Agricultural Development, Industrialization and Rural Inequality*, Harvard University, USA.
- Kuncoro, M. (2015) *Easy to Understand and Analyze Economic Indicators*, UPP STIM YKPN, Yogyakarta.
- Ministry of Finance (2019) *Village Fund Smart Book: Village Funds for People's Welfare*, 2nd ed., Directorate General of Fiscal Balance [online] <https://djpk.kemenkeu.go.id/?p=17351> (accessed 11 July 2023).
- Ministry of Finance (2022) *Village Fund Policy for Fiscal Year 2022* [online] https://djpk.kemenkeu.go.id/wp-content/uploads/2021/01/Sosialisasi-KebijakanDana-Desa-TA-2022_share.pdf (accessed 11 July 2023).
- Ravallion, M. (2016) *The Economics of Poverty: History, Measurement, and Policy*, Oxford University Press, USA [online] <https://lib.hpu.edu.vn/handle/123456789/24569>.
- Ravallion, M., Chen, S. and Sangraula, P. (2007) 'New evidence on the urbanization of global poverty', *Population and Development Review*, Vol. 33, No. 4, pp.667–701, <https://doi.org/10.1111/j.1728-4457.2007.00193.x>.
- Skeldon, R. (2019) 'A classic re-examined: Zelinsky's hypothesis of the mobility transition', *Migration Studies*, Vol. 7, No. 3, pp.394–403.
- Solimun, I. (2010) *Multivariate Analysis of Structural Modeling Partial Least Square-PLS Method*, Image, Malang, CV.
- Solimun, I., Fernandes, A.A.R. and Nurjannah (2017) *Multivariate Statistical Methods, Structural Equation Modeling (SEM) WarpPLS Approach*, UB Press, Malang.
- Sugiyono (2014) *Educational Research Methods: Quantitative, Qualitative, and R&D Approaches*, Alfabeta, Bandung.
- Sunu, M.K.K. and Utama, M.S. (2019) 'The effect of village funds on poverty levels and community welfare in regencies/cities of Bali province', *E-Journal of Economics and Business*, Vol. 8, No. 8, pp.843–872, Udayana University, <https://doi.org/https://doi.org/10.24843/EEB.2019.v08.i08.p02>.
- Suryahadi, A., Suryadarma, D. and Sumarto, S. (2009) 'The effects of location and sectoral components of economic growth on poverty: evidence from Indonesia', *Journal of Development Economics*, Vol. 89, No. 1, pp.109–117, <https://doi.org/https://doi.org/10.1016/j.jdeveco.2008.08.003>.
- Turner, B.L., Moss, R.H. and Skole, D.L. (1993) *Relating Land Use and Global Land Cover Change: A Proposal for IGBP-HDP Core Project*, USA [online] <https://asu.elsevierpure.com/en/publications/relating-land-use-and-global-land-cover-change-2>.
- Vargas-Silva, C. and Rienzo, C. (2019) *Migrants in the UK: An Overview*, Briefing Paper: Migration Observatory, University of Oxford. USA.
- Wahyuddin, W., Ramly, A., Djalil, M.A. and Indriani, M. (2019) 'Effectiveness of village fund utilization in alleviating poverty in Kual a Sub-District, Nagan Raya Regency', *NUANSA: Journal of Islamic Social and Religious Sciences Research*, Vol. 16, No. 2, p.181, <https://doi.org/10.19105/nuansa.v16i2.2410>.
- World Bank (2023) [online] <https://blogs.worldbank.org/opendata/march-2023-global-poverty-update-worldbank-challenge-estimating-povertypandemic#:~:text=At%20%246.85%2C%20the%20global%20povertyAsia%20and%20Sub%2DSaharan%20Africa> (accessed 13 July 2023).
- Zaman, K. and Khilji, B.A. (2013) 'The relationship between growth – inequality–poverty triangle and pro-poor growth policies in Pakistan: the twin disappointments', *Economic Modelling*, Vol. 30, No. 1, pp.375–393, <https://doi.org/10.1016/J.ECONMOD.2012.09.023>.